Entry Procedure for CDF and D0 ADIC Robots

LOTO Procedure for FCC ADIC Robots

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This procedure has been written specifically for the entry of the CDF and D0 robots when service is needed on one side of the unit while the other side is functioning. If both sides are down, then the general Lockout/Tagout procedure must be followed, prior to entry.

All individuals entering either the CDF or D0 robotic units must be trained in Fermilab's Lockout/Tagout Level II Program (LOTO Level II), or have the equivalent training through their own company, and this procedure specific to these units. All individuals entering these units must comply with the following procedure. Any individuals wishing to enter either units for observational purposes that are not trained in the aforementioned LOTO II and entry procedure, may do so only with the accompaniment of a trained individual. The untrained individual must leave the unit when the trained individual leaves the unit. The trained individual is responsible for seeing that the untrained individual has left the entered area before re-enabling the system.

1. If necessary, obtain the key to access the keyboard of the robot from the operator on the first floor.
2. Open the control panel cabinet of the robot for either "Unit 1" or "Unit 2" on the sides of the unit. Verify that the green lights are lit on the controllers labeled Axis 1 through 6. Also, the amber light on the 160 Power Supply should be off. On the CDF robot only, you must check the status of the fourth quad. controller: In the first cabinet on the left side of the robot, verify that the green lights are lit on the controllers and that the amber light is off. If either of these two conditions are not met, solicit expert assistance before proceeding with the access because there may be a malfunction in the power supply readout LEDs.
3. Open the control panel cabinet of the quad. towers for either "Unit 1" or "Unit 2" on the left side of the keyboard. Verify that the green lights are lit on the controllers labeled Axis 1 through 6. Also, the amber light on the 160 Power Supply should be off. If either of these two conditions are not met, solicit expert assistance before proceeding with the access because there may be a malfunction in the power supply readout LEDs.
4. Obtain the key for the Mode of Operation located in the drawer beneath the keyboard.
5. Visually verify that robot arm is homed or home robot arm from the AMU. Command is: dasadmin robhome R1 or dasadmin robhome R2
6. Put Mode of Operation in "manual" mode. **
7. Each person must fill out required information on the LOTO tag.
8. Each individual must place their lock on the Plexiglas cover with their tag.
9. Verify that the power to the robot and quad. towers are off by going back to each control panel. If the green lights are off on Axis 1 through 6, and the amber light on the 160 Power Supply is lit, then power supplied to the robot and the towers has been cut. This has been verified initially with a voltage meter through a dry run. If either of these two conditions are not met, solicit expert assistance before proceeding with the access because the power may not be disabled to the robot arm.

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10. Door keys for "Unit 1" and "Unit 2" are located in the drawer beneath the keyboard. Open the door of robot requiring service. *(Interlock is now in place).*
11. Close all of the quad. tower doors. *(Interlock is now in place). Note – This step is only necessary if you want the other side of the robot to continue to have access to the towers.*
12. Perform service or function.
13. Exit area and remove LOTO lock. *Make sure all that have entered the unit have exited before removing the lock!*
14. Press "Control Off" button on main panel.
15. Reattach LOTO lock.
16. Open quad. tower doors. *(If they were closed).* The quad. tower doors will be locked if the robot on the other side made an access to a quadrotower. To unlock the quad. door, you must put the other robot into manual mode. Remember to return to automatic mode if you do this.
17. Make sure that the robot arm is in the home position.
18. Close unit door. (It will lock automatically).
19. Remove LOTO tag and lock.
20. Hit "Control On" button on main panel.
21. Put Mode of Operation in "auto" mode.
22. Check log for message of success, i.e. "Robot 1 Ready, Robot 2 Ready".
23. Put robot keys back in drawer beneath the keyboard.
24. Remember to turn in keyboard key to operator.

At no time should any chemicals be introduced into either units without first contacting the CD Senior Safety Officer. Bringing chemicals into these confined spaces will require additional training and permitting.

** The key that switches the mode from "auto" to "manual" turns off the high voltage to the controllers that operate the robot. There is no way that the robot can be sent any signals to move. This is separate from any functioning/failure of the interlocks.